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ABSTRACT

This is one of six related reports that describe the effects of the current Title I funds allocation formula and examine several alternatives. This particular study focuses in three ways on the implications of using achievement test scores to allocate Title I funds to states and school districts. First, it identifies testing issues to be resolved before achievement data can be used to allocate funds; second, it discusses the procedures and costs associated with obtaining student achievement data to allocate funds to states and school districts; and third, it analyzes likely changes in funding patterns. Based on a review of existing data from national and state testing programs, the report concludes that there is now no adequate source of achievement data to allocate Title I funds among the states or within states to school districts; however, a national testing program to provide such data could be developed. It is estimated that a national testing system to produce state-level estimates of low achievers would cost about $7.2 million over 3 years, while a national testing system to allocate funds directly to each school district would cost at least $53 million over three years. The report concludes that a change from poverty to achievement eligibility criteria is likely to significantly affect Title I funding for many states, but would not affect the relative amount received by each of the four census regions. (Author/JG)

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Using Achievement Test Scores To Allocate Title I Funds

A Report From the National Institute of Education

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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The National Institute of Education
U.S. Department of Health, Education and Welfare
Washington, D.C. 20208

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USING ACHIEVEMENT TEST SCORES TO ALLOCATE TITLE I FUNDS

September 30, 1977

The National Institute of Education
U.S. Department of Health, Education, and Welfare
Washington, D.C. 20208

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PREFACE

The Compensatory Education Study on which this report is based was requested by Congress in the 1974 Elementary and Secondary Education Amendments. The 1974 Amendments emphasize the direct responsibility of the National Institute of Education (NIE) to the Congress. The study began in February of 1975 only after Congress had reviewed an official research plan submitted by NIE; it was funded with $15 million specially set aside from the Title I program appropriation. Results of the study will be reported directly to the President and to the Congress.

This direct responsibility to Congress led NIE to ensure that the study could be planned and integrated within the Institute. A special staff was established to conduct the study, and it was placed in NIE's Educational Equity Group. That staff has planned and closely managed the research on which this report is based and the 35 research projects that make up the whole Compensatory Education Study.

This report was written by Margot Nyitray, based on data and analysis from several sources. CEMREL, Inc., provided material that was used throughout the report. In addition, William Schmidt of Michigan State University provided some of the data analyses in Chapter III. NIE staff members, principally Margot Nyitray, Paul Hill, and Iris Rotberg, integrated the information received from various sources; they are responsible for the conclusions presented here.

Special recognition is due James Harvey and Alison Wolf of NIE for their contributions to the integration and clarity of this report. Catherine Blacknall, Evangeline Ring, Janice Gallop, and Joyce Harris also provided clerical and management support while the report was being written.

The report reflects the work of several people outside NIE. David Wiley directed the CEMREL project; Annegret Harnischfeger, Elinor Woods, and Edward Haertel also made major contributions to the research. E. W. Kelley of Cornell University provided

helpful advice to NIE at several stages in the research. The staff of Biospherics Incorporated worked under immense pressure to prepare the manuscript and produce printed copies on schedule.

Chairman Owen Peagler of the National Advisory Council on the Education of Disadvantaged Children and the members and staff were generous with their time in advising on the execution of the study, as were a great number of educational agencies and associations at the Federal, state, and local levels. The staff of the U.S. Office of Education's Division for the Education of the Disadvantaged has been unfailingly open and helpful throughout the study.

Members of the NIE staff too numerous to mention have offered expert advice on research and helped select contractors. Special thanks are due Patricia Graham, Michael Timpane, Carlyle Maw, and Vera Brown for their suggestions and contributions to the study and this report.

Paul Hill, Director
NIE Compensatory Education Study

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SUMMARY

In enacting Title I of the Elementary and Secondary Education Act in 1965, Congress clearly intended to distribute Federal assistance to school districts in relation to their numbers of low-income children. Since 1965, however, Congress has considered reformulating its funding objectives to allocate funds on the basis of low achievement instead of poverty. In 1974 Congress decided to continue to allocate Title I funds on the basis of numbers of low-income children, while instructing the National Institute of Education (NIE), as part of the Compensatory Education Study, to explore alternative methods for funds allocation.

The purpose of this report is to describe the implications of using achievement test scores to allocate Title I funds to States and school districts. The companion study, reported in another volume in this series, describes the effects of demonstration projects in 13 school districts, some of which are using student achievement measures to identify schools and students to be served by their Title I programs.

This report explores the implications of achievement-based funding in three ways: first, it identifies testing issues which must be resolved before achievement data can be used to allocate funds; second, it discusses the procedures and costs associated with obtaining student achievement data to allocate funds to States and school districts; and third, it analyzes the changes in funding patterns likely to result.

The issues which must be resolved before achievement-based funding can be implemented include the following:

- How to define low achievement for the purpose of funds allocation--To identify low-achieving children, it is necessary to specify the skills on which to assess performance and to establish either absolute or relative standards which distinguish low achievers from others.

- Whom to test in order to establish counts of low-achieving children--To count low-achieving children it is necessary either to test the performance of all children or to specify a subgroup whose performance will be taken to reflect that of all children.

- How to guarantee the accuracy of the data used for funds allocation--The data must be technically accurate and collected in such a way that potential beneficiaries cannot manipulate the results. Some decisions must therefore be made to establish guarantees of the accuracy of the counts of low-achieving children on which funding will be based.

Based on a review of existing data from national and state testing programs, NIE concluded that there is now no adequate source, or combination of sources, of achievement data to allocate Title I funds among the 50 States or within all States to school districts. Neither the available national tests nor the aggregation of existing state tests is sufficient to implement an achievement-based funds allocation system. However, a national testing program to provide such data could be designed and put into effect.

NIE examined the procedures and costs required to implement a national testing system to obtain test data for use in allocating funds to States and school districts. A national testing system could be used to provide state-level achievement eligibility estimates only, leaving within-state allocations to be based on the State's own test data. Or it could be used to provide direct estimates of districts' achievement and eligibility for funds.

In order to describe the activities and costs required to implement a national testing program, NIE made certain assumptions about the subject matter to be tested, the age of the test population, and the frequency of testing. The first assumption is that testing would be restricted to the area of reading. Second, 9-year-olds were chosen as the test population; and third, it was assumed that results would be reported every 3 years.

Based on these assumptions, NIE estimated that a national testing system to produce state-level estimates of low achievers (leaving within-state allocations to be

based on States' own test data) would cost approximately $7.2 million over a 3-year period. However, before state test data could be used for allocations among their districts, regulations and guidelines in a number of areas would have to be established. Forty-two States and the District of Columbia currently have some form of a testing program, but to meet requirements for the use of test data from these programs for funds allocation, modifications that would significantly increase the States' costs would have to be made. The other eight States would need to establish a testing program.

A national testing system to obtain achievement data for funds allocation directly to each school district in the country would cost a minimum of $53 million over a 3-year period.

NIE's research concluded that a change from poverty to achievement eligibility criteria appears likely to have a significant effect on Title I funding for many States, but would not affect the relative amount of money received by each of the four census regions.

National averages cannot be used to predict funding gains or losses with any degree of accuracy for individual school districts. There are average funding shifts in one direction or another, depending on location or demographic composition. However, these shifts typically are accompanied by a large variation in the national average.

This variation occurs for two reasons. First, there are real differences in the patterns of change that would occur in different States. Funding consequences for similar types of districts vary from State to State, even within the same regions. Second, the achievement data needed to make more precise estimates are not available. A system to obtain such data could be implemented within 3 years, but until the necessary data are obtained, no more precise assessment of how achievement-based funding would affect particular places is possible.

THE NIE COMPENSATORY EDUCATION STUDY

REQUEST FOR THE STUDY

The Education Amendments of 1974 (Public Law 93-380), the major education legislation of the 93d Congress, extended and changed the Elementary and Secondary Education Act (ESEA) of 1965 and extended other Federal education programs including the Education of the Handicapped Act and the Adult Education Act, as well as the impact aid, Indian education, and emergency school aid programs.

The law also directed various Federal agencies to conduct studies and surveys so that Congress might have the benefit of more up-to-date and accurate information during its future consideration of legislation to assist elementary and secondary education. Among these directives is Section 821 of the Education Amendments, which instructs the National Institute of Education (NIE) to conduct a study of compensatory education, including compensatory programs financed by States and those funded under authority of ESEA Title I.

Compensatory education includes a number of Federal and state programs in addition to ESEA Title I. The relative size, scope, and long history of Title I mark it as the most important of the compensatory education programs. In order to ensure adequate depth and scope for the study, NIE chose to focus most of its attention on Title I. In 1977, that title, the largest Federal education effort at the elementary and secondary level, provided over $2 billion, most of which was used to improve educational programs for low-achieving students in school districts serving children from low-income families.

Specifically, Section 821 instructs the Institute to conduct a study incorporating:

- An examination of the fundamental purposes and effectiveness of compensatory education programs

- An analysis of the ways of identifying children in greatest need of compensatory education

- An exploration of alternative ways of meeting disadvantaged children's needs, including the use of written educational plans

- An examination of the feasibility, cost, and consequences of alternative ways of distributing Federal compensatory education funds

- Not more than 20 experimental programs for the purpose of examining the issues above

The relevant sections of the 1974 statute authorizing the study are reproduced in Appendix A.

Section 821 also directs the Presidentially appointed National Advisory Council on the Education of Disadvantaged Children to advise the Institute on the design and execution of the study.

Finally, the law, as amended by Public Law 94-482, requires NIE to submit interim reports to the President and Congress on December 31, 1976, and on September 30, 1977, and to submit a final report in September 1978.

LEGISLATIVE BACKGROUND

The breadth of the examination of compensatory education requested of NIE, ranging from the allocation of funds to specific instructional approaches, reflects a number of concerns which figured prominently during the 1974 Congressional consideration of the extension of ESEA Title I. Among the concerns at issue were:

- The effects of altering the definition of poverty used in the Title I allocation formula

- The feasibility of using measures of student achievement rather than numbers of low-income children in the formula

- The possibility of requiring individualized programs of instruction for each student participating in a Title I program

- The merits of requiring school districts to spend as much as 85% of their Title I grants on basic skills instruction in reading and mathematics

- The relatively narrow focus of most prior efforts to evaluate the effectiveness of Title I

RESEARCH STRATEGY

Like the provisions which authorized the study, therefore, NIE's evaluation adopted a wide focus during its examination of compensatory education. Essentially, the Institute has interpreted the provisions of Section 821 as constituting two major requests from Congress. The first requires an assessment of the effectiveness of compensatory education programs in meeting their fundamental purposes; the second requires an examination of several alternatives which might improve the effectiveness of compensatory education programs.

In response to these requests, NIE developed a strategy designed to produce a complete understanding of how the Title I program operates in practice as well as how it might change if any of several alternatives were adopted. The strategy involved the examination of four major areas:

- Funds allocation
- Service delivery
- Student development
- Program administration

The study defined the first three of these areas as the "fundamental purposes" of Title I. The fourth was examined in order to determine how the administrative structure required to implement such a large education program promotes the achievement of the program's purposes as well as how program administration might be improved.

FUNDAMENTAL PURPOSES

To examine the fundamental purposes of compensatory education programs, it is necessary to distinguish the broad philosophical concerns that may have motivated the program's originators from the more concrete operational purposes that are built into the program.

The originators of compensatory education efforts, such as Title I, may have had in mind some very general objectives, including helping to eliminate poverty, contributing to the redistribution of wealth and opportunity, reforming education, and symbolizing society's commitment to helping the disadvantaged. Although it is possible to speculate about what their motivations might have been, the debates, statutes, and official legislative reports that established the program contain a specific set of fundamental purposes, which were described in some detail in the Institute's December 1976 publication, Evaluating Compensatory Education: An Interim Report on the NIE Compensatory Education Study. These purposes, clearly discernible in the statute and accompanying formal Congressional statements, are:

(1) To provide financial assistance to school districts in relation to their numbers of low-income children and within those districts to the schools with the greatest numbers of low-income students

(2) To fund special services for low-achieving children in the poorest schools

(3) To contribute to the cognitive, emotional, social, or physical development of participating students

These three goals of Title I are consistent with one another, but each is not equally important to all Members of Congress. Congressional debates, and even the language of different parts of committee and conference reports, suggest that Members of Congress differ among themselves about the relative importance of the respective purposes. Some Congressional statements imply that the purposes form a hierarchy in which Title I delivers funds and provides services only to increase children's academic achievement (thus making the third the most important). Other statements, however, make it clear that the allocation of funds and delivery of services are important ends in themselves and may, in fact, define the practical limits of Federal action to promote the development of children.

STRATEGY FOR ASSESSING COMPENSATORY EDUCATION

The evaluation of Title I must start from the recognition that the program has several goals, and to focus exclusively on one, improperly ignores the others. Evaluation must also acknowledge that Title I operates through the Federal system and that state and local governments determine what it will be in practice. Although there is only one Federal Title I program, i.e., only one basic framework of laws and policies, it operates differently in every State, in 14,000 school districts, and in countless classrooms. Thus, to understand and evaluate Title I it is necessary to consider the ways in which Federal policy interacts with the actions of States and local educational agencies (LEAs) that actually implement the program.

The early national evaluations of Title I considered only the third goal--contributing to children's development--and often rendered judgments on the efficacy of the program without accounting for the diverse ways in which LEAs had implemented it. Those evaluations overlooked some important truths about Title I: it has several objectives, and under it LEAs deliver a range of services with a variety of aims and emphases to a diverse set of beneficiaries. In contrast to earlier evaluations, therefore, NIE's strategy is designed to (1) provide clear information about what Title I is accomplishing toward achievement of each fundamental purpose and (2) examine the implications of alternative ways of organizing the efforts of the Federal, state, and local governments to achieve these purposes.

THE REPORT

This volume is one of several intended to comply with the statutory requirement that a second interim report be completed not later than September 30, 1977. It presents NIE's findings on the feasibility, costs, and consequences of using counts of low-achieving children in allocating Title I funds to States and school districts. The report describes how the NIE Compensatory Education Study formulated the research issues, and it gives findings and conclusions on the use of test scores for funds allocation. Five additional reports are being published on the following topics:

- The services provided by Title I and other compensatory education programs
- The effects of using counts of low-income children in allocating funds
- The effects of using student achievement to allocate funds within school districts
- Student development in compensatory programs
- Administration of compensatory education

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CHAPTER I. ACHIEVEMENT TEST SCORES AS AN ALTERNATIVE FOR TITLE I FUNDS ALLOCATION

INTRODUCTION

In enacting Title I of the Elementary and Secondary Education Act in 1965, Congress clearly intended to distribute Federal assistance to school districts in relation to their numbers of low-income children. While the objective of providing assistance to districts serving areas with concentrations of poor children remains a part of Title I, since 1965 Congress has also considered formulating its objectives to allocate funds on the basis of numbers of low-achieving, not low-income, children.

Prior to passage of the Education Amendments of 1974, there was intensive discussion in Congress about the desirability and consequences of this alternative. Among the specific proposals for legislative changes in the 93d Congress was H.R. 5163, sponsored by Representative Albert Quie of Minnesota, a bill that would have required that Title I allocations to States, local educational agencies (LEAs), and schools be based on the number of low-achieving students as defined by test results in reading and mathematics.

To advocates of achievement-based funding, the appropriate way to distribute Federal compensatory education funds is on the basis of children's educational performance. Since the ultimate aim of compensatory education is to increase children's achievement, they argue that the best formula for distributing funds must be one which targets money directly to the children whose academic performance is low. Supporters of achievement-based funding regard poverty measures as proxies for low achievement; hence, they argue that these measures do not efficiently identify low-achieving children. They favor using numbers of low-achieving children to distribute Title I funds, instead of numbers of children in poverty.

This view is a contrast to the opinions of those who favor the use of a poverty criterion. This group does not see poverty measures solely as proxies for a measure of low achievement, nor do they believe that using poverty as the Title I eligibility criterion must be justified in terms of its ability to identify the States, districts, or schools which contain the most low-achieving pupils. Some advocates of a poverty-based allocation formula believe that the major role of a compensatory education program is to channel additional resources into areas where there are poor children. Others believe that the purpose of compensatory education programs is to help low-achievers, but they argue that the low-achieving pupils in poor areas must be given priority.

The choice between achievement and poverty as the Title I eligibility criterion can be made only by Congress. It entails a fundamental decision about the objectives of the program--one only legislators have the authority to make. The research performed by the National Institute of Education (NIE) was designed to explore the implications of allocating Title I funds based upon achievement criteria and not to advocate one allocation criterion over another.

ORGANIZATION OF THIS REPORT

This report explores three of those implications. This chapter identifies central issues which must be resolved before any achievement-based funding system can be implemented. Chapter II discusses the procedures involved in calculating how many low-achieving children live within States and school districts and estimates the costs of those procedures. Chapter III presents an analysis of the likely changes in funding patterns that would result from a shift in the Title I eligibility criterion from poverty to achievement.

ISSUES CONCERNING THE DESIGN OF AN ACHIEVEMENT-BASED ALLOCATION SYSTEM

The issues which must be resolved before achievement-based funding can be implemented include:

- How to define low achievement for the purpose of funds allocation--To identify low-achieving children it is necessary to specify the skills on which to assess performance and to establish either absolute or relative standards which distinguish low achievers from others.

- Whom to test in order to establish counts of low-achieving children--To count low-achieving children it is necessary either to test the performance of all children or to specify a subgroup whose performance will be taken to reflect that of all children.

- How to guarantee the accuracy of the data used for funds allocation--The data on which a funds allocation system is based must be technically accurate and ensured against manipulation by potential beneficiaries. Some decisions must, therefore, be made about establishing guarantees of the accuracy of the counts of low-achieving children on which funding will be based.

Defining Low Achievement

In specifying a formula for Title I allocations based on students' achievement scores, a primary issue relates to how low achievement should be defined. This issue centers around two questions: which subject or subjects should be used in measuring achievement and what level of skills is indicative of low achievement.

Subject Area.--Achievement tests are typically developed for a specific skill area, not for achievement in general; and proposals for test-based Title I allocations have usually included several basic skills. In practice, the choice is probably limited to reading, or to reading and mathematics, the areas where most testing currently takes place. If both subjects were included in the testing, procedures would have to be developed to combine the scores in calculating eligibility, because students who are poor readers are not necessarily poor in mathematics.

Level of Achievement.--In calculating the number of eligibles from test data, the level of skill characterized as low achievement also has to be decided. The most significant recent legislative proposal for using achievement data in funds allocation

(H.R. 5163 in the 93d Congress) discussed this issue in terms of the use of norm-referenced versus criterion-referenced tests.

Norm-referenced tests are designed to indicate a student's performance in relationship to others, while criterion-referenced tests are designed to indicate whether a student has mastered a defined set of skills (Popham, 1976). In using test data for funds allocation, low achievement could be defined using an absolute standard based on criterion-referenced procedures or a relative standard based on norm-referenced procedures.

The first alternative--an absolute criterion for Title I achievement eligibility--would require that national standards for achievement be set, e.g., by defining the minimum skills required by society. Test developers and educators do not completely agree on the skills appropriate for particular age groups (Popp, 1977; Beck, 1977). Thus, setting absolute standards for low achievement would require creating a broad national consensus among the public and educators on an appropriate performance level for the children selected for Title I testing.[1] Even if a general goal could be agreed on (e.g., ability to read newspapers), there are no technical procedures for translating these general standards into test questions.[2]

The alternative to absolute standards is to use a norm-referenced procedure and define low achievement as a score below a certain percentile on the test. Thus, eligible students would be those doing more poorly than the average student at that age or grade. While the cutoff could be at any point below the 50th percentile (the average), the actual point selected is likely to have important consequences for the distribution of funds.[3]

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[1] The poverty standard used for current Title I eligibility rests on technical judgments of minimum nutritional needs. This standard is also difficult to define, though no more so than any educational standards which might be developed for achievement eligibility.

[2] Gene V. Glass (1977) has an excellent discussion of the lack of technical or statistical procedures for setting standards or for translating the standards, however they are set, into test items.

[3] The percentile used will also indicate the approximate percentage of children nationwide who will have scores below this. See Chapter III for further discussion of the impact of different achievement score cutoffs on funds distribution.

Whom To Test

In addition to specifying the subjects and standards to be used, an achievement-based formula must specify whose test scores should be used. The issues to be decided include whether to test all pupils or to sample them, and what age and/or grade level should be tested.

Sampling.--The decision on whether or not to sample would probably be easy to make. Testing on a census basis would be a very costly enterprise. By contrast, sampling techniques allow one to test a smaller group while producing adequate data on which to base eligibility estimates.

The size of the sample would determine the accuracy of the resulting estimates. The sampling error for the census poverty estimates currently used for Title I allocations is very small, because the census sample for income data is quite large. The choice of acceptable error ultimately depends on the costs, because increases in sample size will increase costs.

Age Range.--The present poverty-based Title I allocation system relies principally upon the number of 5- to 17-year-olds from low-income families. If an achievement allocation alternative were adopted, the current age range could also be used. However, since achievement is more directly related to schooling, and it would be difficult to obtain test scores for children not enrolled in school, two alternative definitions could be considered: all children in grades K-12, and all 5- to 17-year-olds in grades K-12. The National Center for Educational Statistics (NCES) currently collects only public school enrollment data annually for States and a sample of school districts. New data-collection efforts would therefore be necessary to collect nonpublic school enrollment data as well as enrollment figures for every school district.

Age or Grade Tested.--Once a population definition has been adopted, decisions also have to be made about whether to test the entire age/grade range in the population or to test only at one level. Obtaining test data for the entire age/grade range in the population would require separate tests for children at different levels and would entail very high costs.

The alternative is to test a single age or grade level and to use the data so obtained to estimate eligibility for the entire population. That is, the proportion of low achievers at one age/grade level would be multiplied by the total counts of children to obtain estimates of the total numbers of low achievers. Since test score distributions vary in different ages or grades, using the distribution from one age to represent the population will introduce inaccuracy in the estimates of total eligibles.[4] However, the complexity and costs of obtaining the test data would be greatly decreased.

If a decision is made to test at only one level, a choice must be made about when to test children in their school experience. Students' achievement test scores are affected both by their abilities and their educational experiences in and out of school. The later the tested age or grade, the more the resulting test score distributions will reflect not only pupil abilities and background, but also the extent to which districts have been effective in educating their students. Thus, testing a later age or grade may penalize districts which are especially successful in educating students whose initial achievement levels are low.[5] This could be avoided by testing younger students or those in early grades because test results would more nearly reflect the levels of skills pupils had upon entering school. However, the earliest age or grade at which testing for Title I eligibility could be advised is 7 years, or grade 2. Even at this level, test development and administration would be complicated by the lack of test-taking abilities of such young children.

Regardless of the decision about when to test children, differences in school entry policies also raise problems in deciding whether to select children for testing

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[4]Current census poverty data have comparable problems. Because many respondents do not provide complete income information, the census bureau must estimate their income from other sources. Census data are also affected by the fact that some sampled persons are missed; this is particularly true of the low-income population since their households frequently are difficult to locate.

[5]Current achievement score data indicate that extreme rural and inner-city pupils seem to fall behind in their achievement levels with increasing years of schooling (Harnischfeger et al., 1977). Thus, testing later ages or grades may favor rural and inner-city districts in the distribution of funds.

according to their age or grade level. This is important because States differ with respect to school entry age. For example, if first grade were selected, States and districts that enroll students at age 5 may appear to have more low achievers in first grade, simply because the children in first grade are younger than first graders where the entry age is 6 years old. On the other hand, if age is used, States and districts with higher entry ages will appear to have more low achievers.

A further complication related to the grade-span issue is introduced if the test data is to be used for eligibility estimates for school districts as well as States. This is because not all school districts may have the age or grade level selected for testing. Approximately 5% of all public school districts (located in a small number of States) include only grades 7 to 12 or 9 to 12 (NCES, 1975). Separate testing or estimating procedures would be needed to produce achievement eligibility estimates for these districts if an early grade or age were selected as the preferred level for testing.

Students Excluded from Testing.--A final issue with regard to the test population concerns special groups of students who are typically not included in current testing programs. These include the mentally retarded, handicapped, non-English speakers, and students enrolled in special institutions.

Special tests and extra data collection efforts would be needed to include these students in the testing; these efforts would substantially increase the costs of any testing program. An alternative would be to develop specific definitions of the most severe handicaps and excuse children fitting the definitions from taking the test. Those students unable to take the test would then be counted automatically in the formula for allocating funds. To prevent abuse of these definitions, a maximum proportion to be excluded and thus counted as eligible could be set based on the national average of such children.

Absentees.--The situation with students who are absent on the day of testing is somewhat different. Absentees could not automatically be considered eligible, since high achievers might also be absent. Scheduling make-up tests for absentees seems an unreasonable effort and expense. One possibility would be to perform a special study to develop rules for estimating eligibility rates among absentees.

GUARANTEEING THE ACCURACY OF TEST RESULTS

A guarantee that the test results used for allocation accurately reflect the incidence of low achievement would be crucial to acceptance of an achievement-based system. Such a guarantee requires both that the data be up-to-date and that possible problems of negative incentives be avoided.

Timeliness of Data

One key concern about the income data used in the current Title I formula is the extent to which the counts of poor children are outdated. An achievement-based system could provide information more current than that available from the census, conducted only every 10 years. The extent to which achievement eligibility estimates would be current depends upon the frequency of testing. In selecting the interval between updates of Title I test data, the most important factors are the costs of collecting the data and the stability of test score distributions over time. If pupil achievement varies as much or more than poverty over time, frequent testing would be strongly justified. If student achievement measures exhibit a great deal of stability over time, the need for frequent testing would be reduced.

Available evidence suggests that achievement test scores fluctuate considerably and have followed a downward trend in the past decade (Harnischfeger and Wiley, 1975). This suggests that 2-, 3-, or 4-year intervals between tests would be reasonable. A decision among these three intervals is likely to depend on acceptable trade-offs between the timeliness of data and costs.

The Problem of Negative Incentives

When the use of test score results for funds allocation is discussed, the issue of possible negative incentives must be considered. In general, funds allocation systems do not provide an incentive for school districts or States to improve their educational services. Under the existing poverty-based scheme for allocating Title I funds, the performance of an educational system is not related to the level of funding it receives. Similarly, an achievement-based funding system would provide no positive incentive for better performance. Moreover, such a system could conceivably contain incentives for reduced performance on the part of schools and districts.

NIE's examination of the problem has led to the conclusion that an achievement-based funding system need not contain serious negative incentives. A combination of simple administrative arrangements could make it highly unlikely that any State or school district could manipulate its students' achievement test scores in order to increase its Title I funding.

One way to minimize the incentive for schools to depress students' performance in order to increase their Title I funding is to base funding decisions on the performance of students in the early grades. If very young students are tested, the effects of schooling are likely to have less of an effect on scores than if older students are tested. Thus, the negative incentive in which school systems that are the least successful receive more funds is partially avoided.

Additional measures would be necessary to guarantee that school districts do not manipulate their students' performance or report false results. There are at least four conceivable possibilities: (1) actual cheating in reporting test results; (2) influencing the performance of those taking the test; (3) manipulating the selection of the sample of children tested; and (4) miseducating students generally so they will perform poorly.

The first two possibilities are preventable by having trained, professional outside personnel administer and score the tests. Thus, district or state administrators could not report false numbers. If field staff who are not district or state employees administer the tests, they can also insure that test conditions are uniform and comparable. Test performance could not be affected by altering the amount of time, or providing less than adequate space, light, or other conditions.

Guarding against the third possibility would require strict monitoring of the rules to insure that students intended to be excluded from the testing program, e.g., non-English speaking students, did not in fact take the test and that absenteeism does not seriously distort the results.

Clear and uniform national definitions would have to be developed for identifying the handicapped or non-English speaking students to be excluded from testing. Special monitoring and auditing of district use of these definitions would be needed to prevent the possibility of inflating the number of these students (who are automatically counted as low-achieving).

Absenteeism would have to be carefully monitored for the same reasons. If special rules were devised to estimate the proportion of low achievers among the absentees (such as 40% of all absentees in urban districts counted as eligibles), then some means would be needed to prevent districts from encouraging absenteeism to inflate their eligibility counts. A maximum absentee rate could be established, beyond which all absent students would be considered to have passed the test.

The final possibility, miseducating students so that they perform poorly on the tests is implausible. It would mean either that districts deliberately miseducate a whole population in order to gain funds to improve the education of a segment of it, or that districts miseducate a segment of the population in order to get more funds to serve that same segment. Neither seems likely.

CHAPTER II. FEASIBILITY OF IMPLEMENTING ACHIEVEMENT-BASED ALLOCATIONS

Despite the widespread use of tests in American education, it is not at all apparent that adequate test data now exist to implement an achievement-based Title I funds allocation system. This chapter examines whether it is feasible, using existing test data, to allocate Title I funds on the basis of achievement criteria and, if not, the requirements for implementing such a system. In making this examination, existing data from national and statewide testing programs are reviewed. Based on the review, NIE concluded that no source or combination of sources of achievement data is presently adequate to allocate Title I funds among the 50 States, or within all States to school districts. The chapter describes the procedures and costs associated with implementing a program that would permit the Federal Government to allocate funds to States on the basis of achievement data, leaving state education agencies (SEAs) to select their own testing procedures to allocate funds to districts.

SYSTEMS FOR ACHIEVEMENT-BASED FUNDING

Data for achievement-based Title I funding could be obtained in several ways. One is a national testing program that would provide counts or estimates of the number of low achievers in each school district. These data could be used to calculate each district's allocation, and funds could be distributed directly from the Office of Education (OE) to the school districts.

A second approach would be a nationwide test to obtain estimates of the number of low-achieving students in each State. Funds could be distributed to the States, which could then use their own tests to allocate funds to districts.

A third approach would be to rely entirely on testing by individual States. The number of low achievers in each State could be established by a statewide test, and funds could be allocated to the respective States on the basis of their own test results.

Each State would allocate its funds on the basis of district-by-district counts from the same test.

Finally, funds could be allocated to States on the basis of poverty or some other criterion; achievement test scores would be used only for within-state allocation.

Another series of alternatives involves the use of data other than student achievement test results, such as poverty counts, to allocate funds to school districts, which would then be free to allocate funds among their schools according to counts of low-achieving students.

Present Feasibility

NIE's research indicates that at present achievement-based funding is not feasible to States or to districts. There is no national testing program that can now provide estimates of the number of low achievers, even at the state level. Moreover, although some States have testing data that could be used to allocate funds among their school districts, some do not have suitable data. Thus, a general change to achievement-based funding is not possible, even for within-state funding. The fact that some States have no statewide achievement data also means that Federal funds could not be allocated on the basis of the States' estimates of their numbers of low achievers.

Two limited systems of achievement-based funding are feasible. If funds were allocated to all States on the basis of poverty or other census-based figures, some States could distribute funds internally on the basis of achievement test results. States such as Michigan, California, and New York are using achievement data to allocate their own compensatory education funds. Presumably these States, and several others, could use the same data to allocate Title I funds. Such a limited system of achievement-based funding would be consistent with a proposal contained in a subcommittee draft of H.R. 69, the legislation that extended Title I in the 93d Congress.

Achievement-based funding within school districts is possible now. In a companion volume, NIE reports the effects of demonstration projects in 13 school

districts, some of which are using student achievement measures to identify schools and students to be served by their Title I programs.[1]

The following section focuses on the lack of data suitable for a national system of allocating funds to all States or districts.

Inadequate National Data

The National Assessment of Educational Progress (NAEP) is the largest national testing program in operation. NAEP, funded by the Federal Government through the NCES, is designed to make available, at regular intervals, comprehensive information on the skills of young Americans. Tests in a variety of subject areas, including reading, mathematics, and writing, are given to nationally representative samples of 9- , 13- , and 17-year-olds, and to young adults. New results for any given subject are available every 4 years.

NAEP's testing program is not designed to produce state-by-state or district-by-district estimates of the number of low achievers. Instead, the sample was designed to provide estimates for the Nation and the four geographic regions as well as subgroups classified by sex, level of parental education, size and type of community, and race.

The NAEP results in their present form cannot be used to allocate Title I funds either to States or to school districts within States.

State-Level Data

Because a suitable national testing program for allocating funds to States or districts does not currently exist, NIE examined the possibility that existing state testing programs could be used both to determine States' overall allocations and to distribute funds within States.

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[1] For further information see Demonstration Studies of Funds Allocation Within Districts. Washington, D.C.: National Institute of Education, September 1977.

There are two major obstacles to this approach. Some States do not administer a testing program of any kind. Perhaps more intractable, data from existing state programs are extremely diverse because the tests vary considerably in nature and content. These variations could be reconciled by a special equating study,[2] but other differences in state testing programs make the results impossible to use for comparing the numbers of low-achieving students among States. Different States test different populations, sample in different ways, use different testing procedures, and test at different times of the year; none of these problems can be reconciled satisfactorily through statistical equating procedures. In fact, NIE's effort to assemble a nationwide file of achievement test data proved unsatisfactory even for making rough comparisons of the numbers of low achievers in different States. No available technical resource could resolve the immense differences among state testing programs. Therefore, it is extremely unlikely that state-administered tests could produce estimates accurate enough to allocate Title I funds among States.

Within-State Data

A more limited form of achievement-based funding would involve the use of poverty statistics for state allocations and achievement data from state assessments for district-level funding. This approach could not be adopted immediately by all States, since some States have no testing programs and some state assessment programs are not suitable for district-level allocations.

NIE's research indicates that, at most, 42 States and the District of Columbia have recent experience in collecting test data on a statewide basis.[3] Seven States have no testing programs of any kind, and an eighth has an assessment program but has collected no data since 1970.[4]

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[2] A technical equating study would, in practice, link all scores on state tests to a common scale, as done by the Anchor Test Study for well-known commercial tests.

[3] Many States collect data regularly but not annually; about 36 States collect data in any given school year.

[4] The seven States without a program are Colorado, Kansas, Nebraska, New Hampshire, Vermont, South Dakota, and Wyoming. Oklahoma has not collected data since 1970.

Moreover, not all States with testing programs can provide reliable district-by-district estimates. In some States, district participation in the program is voluntary; in others, very small numbers of pupils per grade are involved. At present, only 22 States and the District of Columbia have achievement test results from every school district in at least one grade or age level in the K-6 range, and only 6 States and the District of Columbia have collected comprehensive data for young children in kindergarten or first grade.

Clearly, no more than 22 States have suitable data to participate in a limited system of within-state allocation.

ESTABLISHMENT OF A NATIONAL TESTING SYSTEM

Because neither the available national tests nor an aggregation of existing state tests is adequate for implementation of an achievement-based funds allocation system, NIE examined the procedures that would be required to implement a testing system and the costs associated with it.

Although NAEP data cannot be used at present to calculate eligibility for Title I funds, the NAEP procedures provide a useful model for estimating activities and costs involved in creating a new national testing program suitable for use in Title I funds allocation.

A national testing system could be used to provide either direct estimates of districts' achievement and eligibility for funds or state-level estimates only, leaving within-state allocations to be based on the states' own test data. Both alternatives are feasible but the latter is considerably less expensive, and is, therefore, examined in greater detail.

Assumptions Underlying Estimates

To describe the activities and costs required for state-level eligibility estimates, NIE made certain assumptions about the subject matter to be tested, the age of the test population, and the frequency of testing.

The first assumption is that testing would be restricted to reading skills. Second, 9-year-olds were chosen as the test population because they comprise the youngest population that NAEP currently tests and for which NAEP experience could be used. Finally, it was assumed that a 3-year interval would be required before the first results could be reported: the 1st year would be devoted to designing the test and selecting the sample of students; the 2d, to administering the test; and the 3d, to reporting the results. If Congress decided that updating the achievement results every other year was desirable, new results could be available every 2 years because the 3d, or reporting, year of the first project could occur simultaneously with the 1st, or design, year of another.

Activities

The activities required to mount a national testing program fall into seven broad categories: setting objectives; developing a test; sample design; printing; collecting data; scoring and calculating eligibility; and reporting.[5] Figure 1 shows these activities phased over a 3-year cycle. The first two activities, setting objectives and test development, involve a series of conferences to establish guidelines for the Title I test and to write the test items. The third activity, sample design and selection, requires technical staff to develop a sampling design that will produce the required level of accuracy in the resulting eligibility estimates.[6]

Most of the cost and effort in a national testing program is involved in administering the test and collecting the data. Trained field staff would be responsible for scheduling, test administration, and initial scoring. To standardize test results, all testing would take place within a 6-week period at the beginning of the school year

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[5] A more complete description of these activities and the level of effort involved can be found in Appendix B.

[6] To produce sample size estimates for this model, an assumption was made that state-level eligibility estimates would be based on a sample design having the same characteristics as the current NAEP sampling design. Alternative assumptions might produce different and lower sample size estimates.

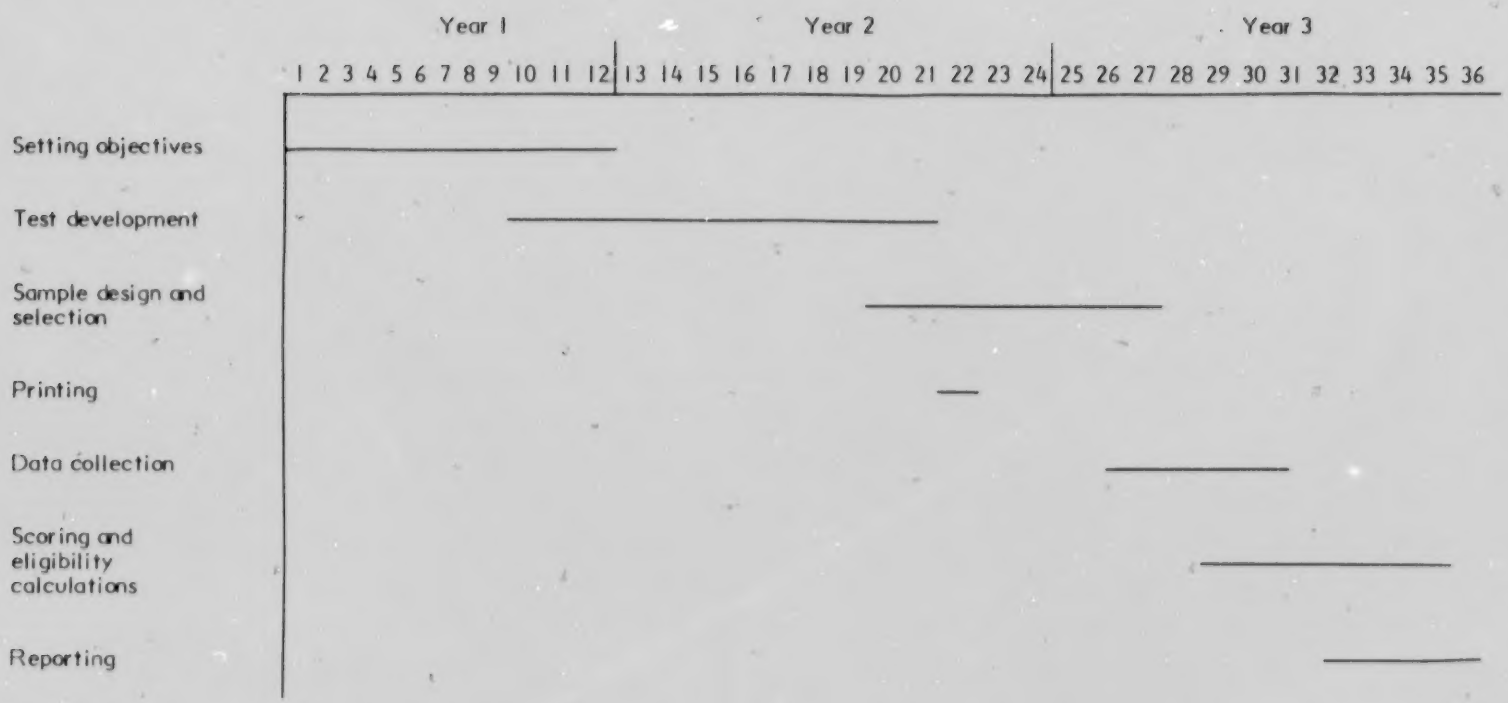
Year 1
Year 2
Year 3
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36
Setting objectives
Test development
Sample design and selection
Printing
Data collection
Scoring and eligibility calculations
Reporting

FIGURE I. SCHEDULE OF ACTIVITIES FOR A NATIONAL TESTING SYSTEM

(October-November), with each test period lasting 1 hour. The final activity is reporting; to ensure the integrity of a national testing program and public acceptance of its results, all aspects of the testing would have to be made public.

National Testing System Costs

Cost estimates for these seven activities were computed for seven common budgetary categories: personnel, travel, occupancy, communications, reproduction, data processing, and supplies and equipment. Table 1 lists the cost estimates by activity and budgetary category for the 3-year cycle.[7] The total cost for a 3-year project to produce Title I eligibility estimates for state allocation would be $7,183,000; this is a minimum for producing one set of state-by-state achievement estimates. If updated estimates were required every other year, testing projects would have to overlap and the average yearly cost would be $3,591,000, or one-half the total cost of a 3-year project.

TABLE 1. NATIONAL TESTING SYSTEM COSTS

	Personnel	Travel	Occupancy	Communications	Reproduction	Data Processing	Supplies and Equipment	Total
Setting objectives	$ 422,000	$ 73,000	$ 30,000	$ 10,000	$ 4,000	$ 30,000	$13,000	$ 582,000
Test development	543,000	99,000	39,000	14,000	7,000	60,000	17,000	779,000
Sample design and selection	408,000	7,000	31,000	10,000	4,000	72,000	15,000	547,000
Printing	16,000	2,000	1,000	1,000	100,000	3,000	1,000	124,000
Data collection	2,008,000	1,000,000	24,000	311,000	14,000	50,000	10,000	3,417,000
Scoring and eligibility calculation	652,000	12,000	56,000	10,000	4,000	785,000	27,000	1,546,000
Reporting	113,000	7,000	10,000	3,000	31,000	20,000	4,000	188,000
Total	$4,162,000	$1,200,000	$191,000	$359,000	$164,000	$1,020,000	$87,000	$7,183,000

[7] Administrative costs are assumed under each category. Detailed information on the cost assumptions and the way costs were calculated is presented in Appendix B, Tables B-1 and B-2.

Nearly 70% of the total testing costs are incurred in data collection and data processing. The costs of these two activities depend on sample size. This sample design assumes testing as many as 250,000 students, which would provide a 10% precision level at the 95% confidence interval.

Three additional activities that would involve extra costs are not included in the above estimates. First, to compute the total number of eligibles for each State, counts of all enrolled children would have to be collected. Second, costs would also be associated with the increased monitoring and auditing required to ensure the reliability of the results. Finally, startup costs were not included in the basic estimates; these are expenses that diminish after one complete assessment cycle. These costs vary, however, depending on the resources and experience of the institution carrying out the project. For an experienced institution like NAEP, startup costs probably would be approximately 10% of the 3-year cost, so the first cycle would cost approximately $7.9 million. A new or less experienced institution would incur higher startup costs.

Cost Estimates for Alternative Models

The basic cost estimates described above apply to a program that would produce state-level Title I achievement eligibility estimates based on a sample of 9-year-olds tested in reading. This section estimates costs for testing programs using alternative procedures.

Multiple Age/Grade Testing.--Testing younger children would require increased time and effort in a number of areas, including test development and data collection, and would probably increase total costs by at least 10%. If several age groups were tested, the total sample size would not necessarily increase. However, several tests would need to be developed, probably increasing costs by 20%.

Multiple Subject Areas.--Testing in more than one subject area would clearly increase costs for all tasks except sample design and student selection. Costs would increase by approximately 50% if the same student sample were tested in one additional subject area.

Change in Precision of Eligibility Estimates.--Changes in the precision of eligibility estimates require changes in sample size that would significantly affect the costs of data collection and data processing. Decreasing the sample size to produce estimates accurate within 20% would drop the total cost of the testing program to approximately $4.3 million for the first 3 years. Increasing precision to the 5% level would require a major increase in the sample size, and total costs would reach $16.5 million in the first 3 years.

District-Level Eligibility Estimates

Estimating eligibility rates for each school district in the country could require a sample size 11 times as large (2.7 million students) as that needed to provide state counts. Although such a project would have some economies of scale, the increases in data collection and processing costs would be very large. These increases are due to the need to sample some students in every district in the country. Total costs of such a program would be at least $53 million in the first 3 years. Even if the precision were decreased from 10% to 20%, total costs would still be at least $43 million.

USE OF STATE TEST DATA FOR WITHIN-STATE ALLOCATIONS

State testing data could be used for within-state allocation of funds in conjunction with a national test, such as that described above, which provides state-level eligibility estimates. Alternatively, the current poverty criteria could be used for allocations among States, and States could be given the option of using their own testing data to allocate Title I funds among their school districts. Because the 42 States that presently have achievement testing or assessment programs vary considerably in testing procedures, regulations and guidelines would have to be developed in a number of areas to ensure some similarity in eligibility definitions and procedures before state achievement data could be used for district allocations. These areas, which correspond to the general issues discussed in Chapter 1, are outlined below.

Defining Low Achievement

Many state testing programs include mathematics, science, and social studies as well as reading. If state testing data were used for determining Title I allocations, provisions defining and limiting the number of tested skill areas would be needed. In addition, the permissible range of cutoffs for eligibility would have to be specified. If this was not done, one State could possibly set the cutoff so high that all its pupils would be eligible, while another State might set an extremely low cutoff and drastically reduce the number of eligible pupils. The resulting pattern of funds distribution to districts would, thus, be very different.

Whom to Test

Some uniform requirement on the age or grade range tested would be necessary. Though States could differ from one to another, each would have to apply uniform definitions among its school districts. Uniform rules and definitions also have to be established for special groups of students (such as mentally retarded and handicapped pupils and absentees) who are not tested. This is an aspect of eligibility assessment that could be heavily abused.

Accuracy of Test Results

To ensure the integrity of the data collection process and avoid manipulation of the results by those with a direct stake in the outcome, regulations on permissible variations in testing procedures (time of testing, physical environment, etc.) would have to be developed. In addition, specific criteria for test administrators would also have to be developed to guarantee the impartiality of those administering the test to students. Local teachers and administrators should not participate in test administration.

State Testing Costs

It is difficult to make precise estimates of the costs to the Federal and state governments of Federal regulations imposed on the use of state test data for district allocations. If the Federal Government required the States to make changes in their

testing programs along the lines suggested above, some Federal financial assistance might be required. A major expansion of effort in the Federal administration of Title I would also be needed to ensure state conformity with Federal regulations about tested populations, testing procedures, and eligibility calculations.

For many States, compliance with the regulations would require major modifications in their current testing programs. Currently, most States hire special staff to test very small numbers of students, or test in every district, using district personnel and teachers to administer the tests. States would, therefore, need to increase the number of students tested or hire field staff to administer the tests; either of these changes is likely to significantly increase costs.

CHAPTER III. CONSEQUENCES OF USING ACHIEVEMENT CRITERIA TO ALLOCATE FUNDS

INTRODUCTION

As Chapter II made clear, there is no single integrated file of achievement test results that can be used to allocate Title I funds to every State and school district. As a result, NIE proposed in the research plan submitted to Congress in December 1975 to construct a file of available achievement test results with which to analyze the funding effects of a change to achievement criteria for Title I.[1]

NIE tried to construct this file using two different approaches. The first involved building a standard national file based on state testing data. NIE surveyed SEAs to learn about the availability of achievement test results. Based on the survey, all state files that possibly could be used to characterize achievement levels in entire States or in school districts within States were obtained. Several months were spent attempting to equate the various test results and to correct for variations caused because States test at different times of the year and employ different rules for selecting samples of students to be tested (Haertel et al., 1977).

The equated file that resulted from this process could not be used to provide reliable estimates of the patterns of Title I funding among States. However, separate files from several States did provide good data that could be used to estimate funding patterns to school districts in those States.

The second approach provided information that could be used to estimate funding patterns among States. It involved using the Anchor Test Study Norming File, which

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[1] Research Plan: Compensatory Education Study. Washington, D.C.: National Institute of Education, December 16, 1975.

lists achievement test results based on a large national sample of schools. In each school, all pupils in grades 4, 5, and 6 were administered the appropriate level of the Metropolitan Achievement Test, Reading, Form F. Approximately 192,000 pupils took the test in April 1972.

The Anchor Test Study data were not originally intended to produce achievement results for individual States. The school sample was nationally, not state, representative.[2] However, large numbers of students were tested in several States, and every State was represented by at least a few students. The Anchor Test Study File, therefore, could be used to estimate the number of low-achieving children by State.

The data files produced by these two approaches were not completely accurate, and each alone provides estimates for only a limited number of places. They do, however, provide enough data to support some analysis about the likely effects of a change in eligibility criteria on the patterns of Title I funding.

ANALYSIS PROCEDURES

NIE used both data files to analyze the patterns of achievement-based funding among regions, States, and types of school districts. Estimates of achievement eligibles for regions and States were derived from the Anchor Test Study File, which was also used to analyze possible consequences for types of districts. The state testing data were also used for analyses of the effects on districts.

At both the state and district levels, the effects of a change to an achievement criterion were assessed by comparing a State's or district's share of the Nation's total

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[2]The Anchor Test Study norming sample consisted of a nationally representative probability sample of 918 schools, comprising 812 public, 92 Catholic, and 14 private non-Catholic. The schools were selected to provide proper national representation on each of the following variables: (1) type of school: public, Catholic, and private non-Catholic; (2) size of school system: district or county; (3) percentage of minority children in the school or minority members in the community; (4) income level of the immediate community in which the school is located; (5) geographic region; (6) degree of community urbanization, as determined by the 1970 census (Bianchini, 1972).

population of low-income children with its share of the Nation's low-achieving children.

State Estimates

For the analyses of funding patterns to States, low-income students were defined according to the current Title I poverty standard, and low-achieving students were defined as those achieving at or below the 15th percentile. This cutoff was selected as the standard for low achievement because it defines as many children to be low-achieving nationwide as the existing poverty standard now identifies as being low-income.

Results for the State of Connecticut provide a concrete example of the ways in which funding patterns were assessed. Children aged 5-17 living in low-income families in Connecticut account for approximately 0.7% of the poor children in the country. Based on the Anchor Test Study data, NIE's estimate is that 1.35% of the low-achieving children in the country live in Connecticut. Thus, Connecticut has a higher proportion of the nation's low-achieving children than of poor children, and it would probably have a higher Title I allocation if funding were based on achievement than on poverty.

Most of the analyses that follow compare only the current Title I eligibles counted under the low-income provisions of the formula with the eligibles that would be counted if an achievement-based formula were adopted. This is because NIE assumes that a change in eligibility criteria would be accompanied by other changes in the formula, and that the crucial comparison is between funding patterns based purely on poverty counts and the results of achievement-based funding.

If the other elements of the existing Title I formula were left intact and counts of low achievers were substituted only for the census counts of poor children, these analyses would still provide reasonable estimates for judging the funding consequences. Most of the elements of the current formula (e.g., the state average per-pupil expenditure "cost factor") would not change, so their effects would be constant.

Only the AFDC counts in the existing formula present a major complication. If those counts, as well as the census counts of poor, were eliminated from the formula, allocations to some States would be more severely affected.[3]

One of the following analyses, therefore, compares achievement eligibles to all current eligibles, including AFDC children, and notes States where the number of AFDC children constitute a significant proportion of all the States' current eligibles.

District Estimates

The discussion of the effects of changing to an achievement-based formula on types of school districts is based on analyses of both the Anchor Test Study data and the state testing file. The Anchor Test data were used to analyze the general effects on different types of districts of a change to achievement criteria for allocating Title I funds. As in the state analyses, low-achieving pupils were defined as those achieving at or below the 15th percentile.

The files for individual States were used to permit closer examination of the effects on types of districts. This involved specifying an achievement cutoff that yields the same number of low achievers in the State as the Anchor Test Study file indicated. The number of students at or below this cutoff was then determined for districts in the State.

Limitations of Analyses

The results of the analyses by State, region, and type of school district provide the clearest available picture--using the only data even remotely suitable for the task--of the funding patterns that might result from a change in the Title I eligibility criterion.

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[3] In 1977, AFDC eligibles accounted for less than 7% of the total Title I eligibles. A detailed discussion of the effects of the inclusion of counts of AFDC children in the current formula can be found in Title I Funds Allocation: The Current Formula. Washington, D.C.: The National Institute of Education, September 1977.

The results do little to reduce uncertainty about the likely consequences of that change. Achievement patterns vary among States and districts, but not in any way that can be neatly characterized according to geography or type of district. Though some States would clearly gain funds in a change from poverty to achievement, similar States would apparently lose funds or be relatively unaffected. Although some rough generalizations can be made about the patterns of funding to types of school districts (e.g., central cities, suburbs, and rural areas) and to places of different demographic composition, those generalizations are often in error when applied to particular districts.

A final limit on the data presented below is that they represent only the results of currently available reading tests for grades 4-6. Tests of other skills, new tests, or tests of grades other than 4-6 might produce very different patterns of achievement than reported here, and hence, very different effects on the allocation of Title I funds.

STATE RESULTS

Table 2 compares the proportion of poverty and achievement eligibles in 34 States and the District of Columbia. The achievement estimates were obtained from the Anchor norming sample. Estimates for the other 16 States are not listed because the error rates are very large.[4]

The table compares the proportion of achievement eligibles with each State's proportion of 1970 census poor children counted in the current formula. Twenty-three of the States and the District of Columbia would experience an increase or decrease of more than 15% of their share of eligibles if achievement criteria were substituted for the 1970 poverty definition. The largest proportional increases would be for the District of Columbia and Connecticut; and the largest decreases, for Oklahoma, West Virginia, and Arizona.

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[4]For 23 States in the table, the error rates at the 95% confidence level are between ± 6% and ± 20%. For the other 11 States, the error rates range from ± 22% to ± 40%. This means that 95 times out of 100 the true figure will be no more than 40% above or below the estimate.

TABLE 2

STATE COMPARISONS OF 1970 POVERTY AND ACHIEVEMENT ELIGIBILITY

	Percent of 5-17 Year-Olds	Percent of 1970 Poverty Eligibles	Percent of Achievement Eligibles	Percent Change in Share of Eligibles
Northeast				
Connecticut*	1.47	.71	1.35	90
New Jersey*	3.43	2.02	1.77	-12
New York**	8.30	6.83	5.73	-16
Pennsylvania**	5.57	3.96	4.26	7
North-Central				
Illinois**	5.45	3.92	5.13	31
Indiana**	2.64	1.60	2.50	56
Michigan**	4.68	2.86	4.53	58
Minnesota*	2.01	1.29	1.12	-13
Missouri**	2.25	2.25	2.03	-10
Ohio**	5.38	3.55	3.63	2
Wisconsin**	2.30	1.35	1.67	24
South				
Alabama**	1.78	3.53	2.88	-18
Arkansas**	.95	2.01	1.50	-25
Delaware*	.28	.23	.35	52
District of Columbia**	.31	.48	1.00	108
Florida**	3.06	3.89	4.06	5
Georgia**	2.33	3.81	5.43	43
Kentucky**	1.60	2.71	2.21	-18
Louisiana**	1.98	4.01	4.44	11
Maryland**	1.97	1.52	2.56	68
Mississippi**	1.21	3.40	3.39	-0.3
North Carolina**	2.51	4.06	3.23	-20
Oklahoma*	1.21	1.59	.82	-48
South Carolina**	1.37	2.69	2.91	8
Tennessee**	1.91	3.19	2.23	-30
Texas**	5.72	8.27	5.62	-32
Virginia**	2.27	2.79	3.30	18
West Virginia*	.84	1.38	.88	-36

TABLE 2 (Continued)

	Percent of 5-17 Year-Olds	Percent of 1970 Poverty Eligibles	Percent of Achievement Eligibles	Percent Change in Share of Eligibles
West				
Alaska*	.16	.16	.30	87
Arizona*	.92	1.09	.70	-36
California**	9.47	7.74	9.75	26
Colorado*	1.12	1.93	.86	-8
New Mexico*	.59	1.04	.69	-34
Oregon*	1.01	.70	.79	13
Washington*	1.67	1.04	1.10	6
TOTAL	89.72	92.60	94.72	

*Error rates for these estimates are between ± 22% and ± 40%.

**Error rates for these estimates are between ± 6% and ± 20%.

Table 3 compares achievement eligibles with each State's proportion of poor children in 1975. The 1975 poverty figures are more recent estimates from the Survey of Income and Education (SIE) and might approximate more closely the poverty counts that will be obtained in the next census.[5] As the table indicates, the pattern of change is different when 1975 poverty counts are compared to achievement criteria. Twenty-three States experience an increase or decrease of more than 15%. However, the particular States affected and the direction of change are generally different if 1975 poverty and achievement are compared rather than 1970 poverty and achievement. Using 1975 poverty as the base, Alaska is one of the States with the largest proportional increase, and New Mexico and New Jersey are among the States with the largest decreases.

The 1975 poverty counts also result in a different distribution of funds than do the 1970 poverty counts. However, the amount of money that would shift among States in a change from 1970 to 1975 poverty counts would not be as large as the shift that would result if achievement criteria replaced the 1970 data. In addition, the

[5]Further discussion of the SIE data can be found in Title I Funds Allocation: The Current Formula. Washington, D.C.: National Institute of Education, September 1977.

TABLE 3

STATE COMPARISONS OF 1975 POVERTY AND ACHIEVEMENT ELIGIBILITY

	Percent of 1975 Poverty Eligibles	Percent of Achievement Eligibles	Percent Change in Share of Eligibles
Northeast			
Connecticut	.86	1.35	57
New Jersey	2.77	1.77	-36
New York	7.54	5.73	-24
Pennsylvania	4.87	4.26	-12
North-Central			
Illinois	5.71	5.13	-10
Indiana	1.76	2.50	42
Michigan	3.67	4.53	23
Minnesota	1.27	1.12	-12
Missouri	2.30	2.03	-12
Ohio	4.33	3.63	-16
Wisconsin	1.50	1.67	11
South			
Alabama	1.96	2.88	47
Arkansas	1.41	1.50	06
Delaware	.20	.35	70
District of Columbia	.34	1.00	194
Florida	4.58	4.06	-11
Georgia	3.44	5.43	58
Kentucky	2.38	2.21	-07
Louisiana	3.15	4.44	41
Maryland	1.46	2.56	75
Mississippi	2.75	3.39	23
North Carolina	3.11	3.23	04
Oklahoma	1.23	.82	-33
South Carolina	2.28	2.91	28
Tennessee	2.72	2.23	-18
Texas	8.14	5.62	-31
Virginia	2.16	3.30	53
West Virginia	1.11	.88	-21

Table 3 (Continued)

	Percent of 1975 Poverty Eligibles	Percent of Achievement Eligibles	Percent Change in Share of Eligibles
West			
Alaska	.07	.30	328
Arizona	1.08	.70	-35
California	9.07	9.75	07
Colorado	.83	.86	04
New Mexico	1.07	.69	-36
Oregon	.59	.79	33
Washington	1.16	1.10	-05

individual States that would gain or lose funds are not the same States that would gain or lose under a change to an achievement criterion.[6]

Achievement Eligibles Compared With All Title I Eligibles.--The proportion of achievement eligibles in each State was also compared to its proportion of all eligibles counted in the Title I formula (i.e., counts of low-income children, Aid to Families With Dependent Children (AFDC) children, and neglected, delinquent, and foster children). Table 4 presents the findings. Although for most States, the addition of AFDC counts do not change the extent to which they are likely to gain or lose funds due to a change to achievement criteria, it does make a difference in some. For example, New Jersey and New York, which would lose some funds if achievement data were to replace counts of low-income children, would lose even more if counts of low-achieving children replaced counts of eligible children under the current formula.

REGIONAL RESULTS

Table 5 compares the proportion of 1970 poverty and achievement eligibles located in each of the four census regions. These estimates were obtained by summing

[6]Table C-I in Appendix C contrasts changes in shares resulting from a shift from 1970 to 1975 poverty counts with those resulting from a change from 1970 poverty counts to achievement.

TABLE 4

STATE COMPARISONS OF TOTAL CURRENT TITLE I ELIGIBLES
AND ACHIEVEMENT ELIGIBLES

	Percent of Total Title I Eligibles	Percent of Achievement Eligibles	Percent Change in Share of Eligibles
Northeast			
Connecticut	.79	1.35	71
New Jersey	2.29	1.77	-23
New York	8.65	5.73	-34
Pennsylvania	4.27	4.26	-0.2
North-Central			
Illinois	4.46	5.13	15
Indiana	1.55	2.50	61
Michigan	3.67	4.53	23
Minnesota	1.32	1.12	-15
Missouri	3.06	3.39	11
Ohio	3.40	3.63	-7
Wisconsin	1.48	1.67	13
South			
Alabama	3.22	2.88	-11
Arkansas	1.83	1.50	-18
Delaware	.22	.35	59
District of Columbia	.49	1.00	104
Florida	3.59	4.06	13
Georgia	3.48	5.43	56
Kentucky	2.49	2.21	-11
Louisiana	3.66	4.44	21
Maryland	1.45	2.56	76
Mississippi	3.06	3.39	11
North Carolina	3.73	3.23	-13
Oklahoma	1.46	.82	-44
South Carolina	2.44	2.91	19
Tennessee	2.91	2.23	-23
Texas	7.54	5.62	-25
Virginia	2.62	3.30	26
West Virginia	1.27	.88	-31

Table 4 (Continued)

	Percent of Total Title I Eligibles	Percent of Achievement Eligibles	Percent Change in Share of Eligibles
West			
Alaska	.16	.30	88
Arizona	1.01	.70	-31
California	8.19	9.75	19
Colorado	.89	.86	-3
New Mexico	.95	.69	-27
Oregon	.76	.79	4
Washington	1.13	1.10	-3

the individual estimates for each State in the region (using all 50 States and the District of Columbia). The table shows that a change from 1970 poverty to achievement criteria would make little difference in the overall share of funds going to each region. The small shifts that occur for different regions are not statistically significant.

TABLE 5

ESTIMATED PERCENT OF 1970 POVERTY AND ACHIEVEMENT ELIGIBLES LOCATED IN FOUR GEOGRAPHIC REGIONS

	Percent of 5-17 Year-Olds	Percent of 1970 Poverty Eligibles	Percent of Achievement Eligibles
Northeast	22.96	16.19	15.29
Central	28.66	20.00	22.71
South	31.30	49.56	46.82
West	17.08	14.25	15.18
Overall	100.00	100.00	100.00

In general, although a change from poverty to achievement eligibility appears likely to have a significant effect on Title I funding for many States, it would not affect the relative amount of money received by each of the four census regions.

TYPES OF SCHOOL DISTRICT

The Anchor Test Study data were also used to compare the proportions of poverty and achievement eligibles in different types of places.[7] The analysis results allow rough estimates of the relative proportions of poverty and achievement eligibles located in different types of school districts. Districts are categorized according to location--central cities, suburbs, and nonmetropolitan areas--and demographic composition--proportions of 5- to 17-year-olds in three racial/ethnic categories: white, black, and Spanish surnamed.[8]

Location

Nonmetropolitan areas would probably lose funds if achievement criteria were substituted for poverty criteria. By contrast, cities and suburbs would gain, but these gains are not statistically significant because the variation around the national trend is very high. Thus, urban and suburban districts in some areas are likely to gain funds, while those in other areas are likely to lose.

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[7] Data on the proportions of poverty and achievement eligibles and on the proportions of 5- to 17-year-olds in various locational and demographic categories in each State were used to develop a model comparing estimated poverty and achievement eligibility for different groups of children. For a technical description of the regression analysis techniques used, see Haertel et al., 1977a.

[8] Standard Census Bureau definitions of location are used. Central cities include all cities over 250,000 and other cities ranging in size from about 15,000 to 250,000 people that are officially designated as central cities. Suburbs include any other jurisdiction with a population over 25,000 in a standard metropolitan statistical area (SMSA), as well as rural counties located within SMSAs. Nonmetropolitan areas include all areas outside SMSAs. These definitions are not necessarily synonymous with common usage of the terms urban, suburban, and rural.

Demographic Composition

On average, school districts with high percentages of blacks would be likely to gain funds if an achievement-based allocation system were used. Districts with high proportions of whites would be likely to lose funds; there would generally not be major differences in funding for districts with high proportions of Spanish-surnamed children.

Effects of Alternative Cutoffs

Parallel analyses were conducted using alternative definitions of low achievement ranging from the 7th to 30th percentiles. These analyses of alternative cutoffs indicate that the definition of low achievement used in an achievement-based funding system will have significant consequences for the distribution of funds. At cutoffs above the 15th percentile, the distribution of achievement eligibles resembles the distribution of the 5- to 17-year-olds in the population. If the 28th percentile, for example, is used as the cutoff, 30% of the low achievers are in cities--a proportion very close to the proportion of all 5- to 17-year-olds in these places. When achievement eligibility limits are set low, at the 7th percentile, approximately 42% of low-achieving children are in cities. Therefore, cities would receive proportionately more funds as the cutoff is lowered, and proportionately less as the cutoff is raised.

The reverse is likely to be true for suburban areas; they are likely to gain funds as the cutoff is raised. At lower cutoff levels, however, their share of funds is likely to approximate the share they currently receive. Nonmetropolitan areas are likely to lose about the same amount of funds in a shift from poverty to achievement for any cutoff between the 7th and 30th percentile.

The definition of low achievement would also affect the distributional consequences of a shift from poverty to achievement criteria for districts of varying racial/ethnic composition. As the cutoff point is increased, the proportion of achievement eligibles for districts with high concentrations of blacks declines, and the proportion of eligibles for districts with high proportions of whites increases.

EFFECTS WITHIN STATES

The previous findings have shown that national averages cannot be used to predict funding gains or losses with any degree of accuracy for individual school districts. For some categories, there are general trends, but variation around the national average is considerable.

This variation occurs for two reasons. First, the achievement data needed to make precise estimates are not available. Second, there are real differences in the patterns of change that would occur in different States. Although generally areas with high proportions of white children are likely to lose funds, in some States they are likely to gain.

Within-state estimates are illustrated below for a small sample of States. The information shows that funding patterns for districts within particular States may differ from national patterns.

Because the achievement data come from state testing programs, the achievement estimates are based on a variety of different reading tests administered at different periods of time and to different grade levels.[9] The cutoff on each state test was selected so the resulting number of achievement eligibles in the State would correspond to the number of achievement eligibles estimated from the Anchor data. Hence, the funding gains or losses for districts within particular States would be relative to the overall gain or loss in funds for that State.

Seven States were selected for analysis: Rhode Island and New York in the Northeast; Alabama and Florida in the South; Michigan in the North-Central region; and California and New Mexico in the West.

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[9] The base population used for these analyses was the number of 5- to 17-year-olds in K-12 districts. This number was used to avoid problems of variation in district grade spans in these States. Details on the test data used in these analyses can be found in Table C-2.

Location

Table 6 describes the consequences of a shift from 1970 poverty to achievement eligibility criteria for districts in different locations. These within-state analyses explain why there is so much variation around the national averages. Funding consequences for similar types of districts are likely to vary from State to State, even within the same region. If achievement criteria were used, cities and suburbs would gain funds in some States but would lose or show no change in others.

Patterns are more consistent for nonmetropolitan areas, which would lose funds in six of the seven States. This finding is consistent with the national estimates in which nonmetropolitan areas also showed statistically significant losses.

Demographic Composition

The possible impact of a change from poverty to achievement criteria was also estimated for districts of different racial/ethnic composition in six of these States.[10]

As Table 7 indicates, the results vary from State to State. If achievement criteria were used, districts with high proportions of black or Spanish-surnamed children would gain funds in some States and would lose or show no change in others. The results for districts with high proportions of white children also differ among States. Thus, the data illustrate that the national trends provide only rough estimates of the funding shifts that would occur if achievement eligibility criteria were used.

To conclude, the difficulty NIE experienced in obtaining and standardizing usable data for the analyses presented in this chapter confirm the fact that reliable achievement data are not currently available to permit an achievement-based allocation system. Such a system is feasible, and the necessary data could be obtained over a 3-year period. Until such data have been collected no more precise assessment of how an achievement-based formula would affect specific school districts is possible.

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[10] Rhode Island was not included because the number of minority children in the State was too small.

TABLE 6

DIRECTION OF ESTIMATED CHANGES IN PROPORTION OF ELIGIBLES FOR DISTRICTS IN VARYING LOCATIONS

	Change in Proportion of Eligibles*
Northeast	
New York	
Central cities	+
Suburbs	-
Nonmetropolitan areas	-
Rhode Island	
Central cities	0
Suburbs	0
Nonmetropolitan areas	0
South	
Alabama	
Central cities	+
Suburbs	+
Nonmetropolitan areas	-
Florida	
Central cities	+
Suburbs	0
Nonmetropolitan areas	-
North-Central	
Michigan	
Central cities	-
Suburbs	+
Nonmetropolitan areas	-
West	
California	
Central cities	0
Suburbs	0
Nonmetropolitan areas	-
New Mexico	
Central cities	+
Suburbs	**
Nonmetropolitan areas	-

*Key: + = increase, - = decrease, and 0 = no significant change.

**The size of the suburban population in New Mexico is too small to make an accurate estimate of the direction of change.

TABLE 7

DIRECTION OF ESTIMATED CHANGES IN PROPORTION OF ELIGIBLES FOR DISTRICTS OF VARYING DEMOGRAPHIC COMPOSITION

Districts with high concentrations of:	Change in Proportion of Eligibles
Northeast	
New York	
Whites	-
Blacks	+
Spanish surnamed	+
South	
Alabama	
Whites	0
Blacks	0
Spanish surnamed	**
Florida	
Whites	-
Blacks	0
Spanish surnamed	+
North-Central	
Michigan	
Whites	+
Blacks	-
Spanish surnamed	0
West	
California	
Whites	-
Blacks	+
Spanish surnamed	+
New Mexico	
Whites	+
Blacks	***
Spanish surnamed	-

*Key: + = increase, - = decrease, 0 = no significant change.

**The size of the Spanish-surnamed population in Alabama is too small to make an accurate estimate of the direction of change.

***The small size of the black population in New Mexico makes accurate determination of the likely changes problematic.

APPENDIX A. SECTIONS 821 AND 150
OF PUBLIC LAW 93-380

Public Law 93-380
93rd Congress, H. R. 69
August 21, 1974

An Act

To extend and amend the Elementary and Secondary Education Act of 1965, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Education Amendments of 1974".

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Part B—Educational Studies and Surveys

study of purposes and effectiveness of compensatory education programs

Sec. 821. (a) In addition to the other authorities, responsibilities and duties conferred upon the National Institute of Education (hereinafter referred to as the "Institute") by section 405 of the General Education Provisions Act and notwithstanding the second sentence of subsection (b)(1) of such section 405, the Institute shall undertake a thorough evaluation and study of compensatory education programs, including such programs conducted by States and such programs conducted under title I of the Elementary and Secondary Education Act of 1965. Such study shall include—

(1) an examination of the fundamental purposes of such programs, and the effectiveness of such programs in attaining such purposes;

(2) an analysis of means to identify accurately the children who have the greatest need for such programs, in keeping with the fundamental purposes thereof;

(3) an analysis of the effectiveness of methods and procedures for meeting the educational needs of children, including the use of individualized written educational plans for children, and programs for training the teachers of children;

(4) an exploration of alternative methods, including the use of procedures to assess educational disadvantage, for distributing funds under such programs to States, to State educational agencies, and to local educational agencies in an equitable and efficient manner, which will accurately reflect current conditions and insure that such funds reach the areas of greatest current need and are effectively used for such areas;

(5) not more than 20 experimental programs, which shall be reasonably geographically representative, to be administered by the Institute, in cases where the Institute determines that such experimental programs are necessary to carry out the purposes of clauses (1) through (4), and the Commissioner of Education is authorized, notwithstanding any provision of title I of the Elementary and Secondary Education Act of 1965, at the request of the Institute, to approve the use of grants which educational agencies are eligible to receive under such title I (in cases where the agency eligible for such grant agrees to such use) in order to carry out such experimental programs; and

(6) findings and recommendations, including recommendations for changes in such title I or for new legislation, with respect to the matters studied under clauses (1) through (5).

(b) The National Advisory Council on the Education of Disadvantaged Children shall advise the Institute with respect to the design and execution of such study. The Commissioner of Education shall obtain and transmit to the Institute such information as it shall request with respect to programs carried on under title I of the Act.

(c) The Institute shall make an interim report to the President and to the Congress not later than December 31, 1976, and shall make a final report thereto no later than nine months after the date of submission of such interim report, on the result of its study conducted under this section. Any other provision of law, rule, or regulation to the contrary notwithstanding, such reports shall not be submitted to any review outside of the Institute before their transmittal to the Congress, but the President and the Commissioner of Education may make to the Congress such recommendations with respect to the contents of the reports as each may deem appropriate.

(d) Sums made available pursuant to section 151(i) of the Elementary and Secondary Education Act of 1965 shall be available to carry out the provisions of this section.

(e)(1) The Institute shall submit to the Congress, within one hundred and twenty days after the date of the enactment of this Act, a plan for its study to be conducted under this section. The Institute shall have such plan delivered to both Houses on the same day and to each House while it is in session. The Institute shall not commence such study until the first day after the close of the first period of thirty calendar days of continuous session of Congress after the date of the delivery of such plan to the Congress.

(2) For purposes of paragraph (1)—

(A) continuity of session is broken only by an adjournment of Congress sine die; and

(B) the days on which either House is not in session because of an adjournment of more than three days to a day certain are excluded in the computation of the thirty-day period.

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"ALLOCATION OF FUNDS WITHIN THE SCHOOL DISTRICT OF A LOCAL EDUCATIONAL AGENCY

"SEC. 150. (a) For any fiscal year not more than 20 local educational agencies selected for the purpose of section 821(a)(5) of the Education Amendments of 1974 may elect, with the approval of the district-wide parent advisory council which is required to be established under section 141(a)(14) of this title, to allocate funds received from payments under this title on the basis of a method or combination of methods other than the method provided under section 141(a)(1)(A). Any method selected pursuant to this section shall be so designed and administered as to be free from racial or cultural discrimination.

"(b) Any local educational agency to which this section applies shall submit such reports to the Director of the National Institute of Education at such time and in such manner as the Director may reasonably require to carry out his responsibilities under section 821(a)(5) of the Education Amendments of 1974.

APPENDIX B. COST ESTIMATES FOR A NATIONAL TESTING SYSTEM

APPENDIX B. COST ESTIMATES FOR A NATIONAL TESTING SYSTEM

ACTIVITIES

This section provides a detailed description of the activities involved in a national testing program for Title I allocations and indicates the level of effort that was used to estimate the costs of such a program.[1]

Setting Objectives

The first step in mounting any testing program is to decide what is to be measured. If Congress were to decide to base Title I eligibility on national minimum standards for the skills and knowledge that children at the selected age or grade levels should have, the process would require broad societal participation. Because the analysis assumes that the subject matter of the test will be reading, the first task would be to develop age-specific educational goals in that area. The entire specifications process would include: general goal setting, specifying objectives, and setting standards for the objectives.

If Congress were to decide to use a simple percentile cutoff or other norm-referenced procedures to determine eligibility for Title I, the process would be simpler. It would not be necessary to set a precise standard for the reading attainment of any age group or grade level. It would only be necessary to provide some general objectives to guide test development.

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[1] These estimates were prepared for NIE by CEMREL, Inc. The National Assessment for Educational Progress is also preparing estimates of the technical procedures involved in conducting national testing for Title I allocations. For further information, see NAEP (1977).

If the entire testing project is to be completed within 3 years, developing objectives and standards must be stringently scheduled so that it can be completed in 12 to 15 months. Six full-time professional and 10 support staff would be required for a 12-month period.

This task involves a series of hearings and conferences:

- Four hearings on standard setting lasting 2 days each, with eight invited speakers per day
- Two conferences on standard setting lasting 3 days with 15 invited participants, each of whom is asked to spend an additional day preparing for each conference
- Two conferences on objective specification lasting 3 days each with 15 invited participants, each of whom is asked to spend an additional day preparing for each conference
- One review conference lasting 3 days with 12 invited participants

Test Development

Designing the actual test instrument would require substantial attention. It is assumed that the test would include NAEP-type multiple-choice and open-ended items. Further, a test of 1 hour's-duration, consisting of about 50 items, should be sufficient for eligibility estimation.

Test items or exercises must be written according to specifications regarding their number, type, focus, and intended difficulty. If possible, existing pools of test items could be relied upon to reduce the amount of new writing required. Documentation should include scoring instructions. Small-group conferences of reading experts with experience in the education of the targeted age groups should be organized for this purpose. Because of the importance of the test results, public review and participation would also be required. In addition to writing test items, test development includes tryouts to provide information on content validity,

administrative feasibility, timing, and clarity of directions. Results of these tryouts could be used to select or modify items for use in the final test instrument. Finally, procedures should be developed for scoring and calculating eligibility.

A 12-month period for test development[2] with 8 full-time professional and 12 support staff as well as staff for item tryout is needed. This task also involves a series of conferences:

- Twenty item-writing conferences lasting 3 days each with six invited participants each
- Two review conferences lasting 3 days each with 12 invited participants each

Sample Design

The task is to develop a sampling design for national testing of 9-year olds in reading to produce Title I achievement eligibility estimates. For the purpose of exploring alternative costs, sampling requirements were estimated for three different levels of precision. Sampling designs were devised which would produce error rates of 5%, 10%, and 20% of the number of eligibles.[3] Separate estimates were also made of the sampling requirements for state-level and school district-level counts of eligible children. To deal with the problem of district-level estimates for high school districts, the model assumes that a special analysis of feeder districts will be conducted in order to develop procedures for estimating rates for high school districts without special testing.

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[2] It should be noted that current NAEP objectives specification and test development activities involve considerably larger numbers of people and longer time periods.

[3] A detailed technical discussion of the procedures used to estimate sample sizes for eligibility estimates at various accuracy levels can be found in Harnischfeger, Huckins, and Wiley (1977).

Because of differences that alternative sampling designs may have on costs and precision, an assumption was made that state-level estimates of eligibility will be based on a design with the same stratification and clustering characteristics as the current NAEP national sampling design. For state-level eligibility estimates and a precision level of 10%, these assumptions result in an estimated sample size of 250,000 and for 5% and 20% precision levels 700,000 and 75,000, respectively. For district-level Title I eligibility counts, these assumptions require a sample of approximately 2.7 million pupils for estimates precise within 10%, samples of 3.1 million for 5% precision, and 2.0 million for 20% precision. Pupils who cannot be tested (mentally retarded, handicapped, non-English speaking, absentees) would be counted as eligible, except for absentees for whom eligibility weights would be developed in a special study.

This task would require 10 professional and 16 support staff, assuming an 8-month period for sample design and selection.

Printing

Printing varies as a function of sample size and test length, but also according to the kinds of items used and their answer modes. Items for certain subject areas and also for certain ages take up more space and are more difficult to set and print than those for other ages and areas. Also, testing at the youngest ages does not permit the use of separate answer sheets. Instead test booklets would have to include formats for the pupils' responses. This latter provision, which is assumed for cost purposes, does not permit reuse of test booklets. This activity also includes the distribution of test booklets to field staff.

Printing of test booklets is costed at $.40 for each package. This figure includes staff directly concerned with printing. For general management of this process, 3 professional and 5 support staff months are estimated.

Data Collection

In order to ensure the integrity of the data-collection process, tests would be administered by field staff, not district or school personnel. The field staff would include supervisors and test administrators. Once schools were selected to participate in the testing, the supervisors would be responsible for notifying school personnel, scheduling, and obtaining lists of pupils at the appropriate age or grade levels. A sample of pupils would be randomly selected from the lists according to the specifications of the sample design. After the sample of pupils was selected in a school, the tests would be administered by test administrators hired and trained by the regional supervisors. It is important that test administration applicants be carefully screened and trained.

Time of testing during the school year and on the school day is an important factor influencing achievement test results. It should be standardized as much as possible. The model assumes that testing will take place within a 6-week period at the beginning of the school year (October/November), so that results are available for the following year's allocations, and that testing will take place only during the morning hours. It is also important to specify the number of pupils to be tested in group administrations (16) and the length of the testing period (1 hour).

The field work is estimated to require 200 field supervisors at 3.5 months each. This includes: training (1 week); contacting schools, sampling students, and hiring test administrators (6 weeks); supervising test administrators (6 weeks); and followup work (1 week). The 450 test administrators, at 1.5 months each, would perform, on average, 1.5 test administrations per morning, 4 days per week. Their afternoons would be used for test editing. It is estimated that they need only 2 hours of training, which is included in their employment time. Nonfield staff is estimated at a minimum of 12 professional and 16 support staff for 5 months each. These estimates include recruiting of field staff, especially supervisors.

Scoring and Eligibility Calculation

Scoring procedures depend heavily upon the types of test items used. It is assumed that most item answers would be machine readable and machine scorable with no more than 5 minutes of "handscoring" per tested pupil. Once responses were in machine readable form, the information would be transferred from the completed test bookiets to computer data tapes which would be checked and edited.

Once a final edited tape was produced, individual item response patterns could be translated into estimates of the proportion of eligibles. The final estimated eligibility rate and the size of the base population in an area would then be multiplied to provide the estimate of the number of eligibles for Title I funding.

These tasks would require an estimated 12 professional and 16 support staff for 7 months each. Furthermore, handscoring requires employment of 45 scorers for 4 months each.

Reporting

In addition to reporting eligibility rate estimates to OE, public officials, educators, and the general public, there will be demands for technical documentation and summary reports on the testing procedures and instruments. The special requirements of an achievement-based funds allocation procedure suggest that all aspects of the testing program should be made available for public review.

Reporting on the testing program would be especially important if the national testing is used only for allocating funds at the state level and if within-state allocations are to be made using state testing and assessment programs. The national testing procedures would provide a useful prototype--one which States could imitate in building their own testing programs only if details of the national program are publicly disseminated.

Report generation is estimated to require 4 professional and 12 support staff for 4 months each.

TABLE B-1

COSTS IN EACH BUDGETARY CATEGORY

Resource Category	Cost
Personnel (salary and fringe benefits)	
Professional staff, consultants, hearing and conference participants	$34,000 per year*
Support staff and scorers	$17,000 per year
Field supervisors	$18,000 per year
Test administrators	$12,000 per year
Travel	
Conference, hearing participants, and nonfield staff**	$300 per trip
Field supervisors' travel per diem	80% of salaries
Test administrator travel to schools	$9 per trip
Occupancy	
Nonfield staff	$150 per person-month
Hearings, conferences, and training sessions	$50 per day
Communication	
Nonfield staff (telephone, mailing, shipping)	$50 per person-month
Field supervisors	17% of salaries
Shipping or mailing of test packages	$.50 per test package
Mailing final reports	$.40 per report

TABLE B-1 (Continued)

Resource Category	Cost
Reproduction	
Nonfield staff general reproduction	$20 per person-month
Field supervisor training materials	$30 per field supervisor
Field, test administrator training materials	$5 per test administrator
Test printing for tryouts	$1.50 per test package
Printing of final test packages	$.40 per test package
Report reproduction (about 100 pages each)	$1.50 per copy
Data processing	Estimated by task
Supplies and equipment	
Nonfield staff (includes maintenance of equipment)	$70 per person-month

*One year is assumed to have 12 months at 20 days.

**Nonfield staff includes professional and support staff and scorers.

TABLE B-2. CALCULATION OF COST ESTIMATES FOR NATIONAL TESTING

SETTING OBJECTIVES

Personnel	n	Months/ Persons	Total Months	Salary per Person-Year	Total Cost
Professional staff	6	12	72	$34,000	$ 204,000
Support staff	10	12	120	$17,000	170,000
			192		
Conference/hearing participants			17*	$34,000	48,000*
					$ 422,000

Travel		Days	Travel Cost	Per Diem	
Staff	36	108	$300	$ 55	$ 17,000
Conference/hearings	136	280	$300	$ 55	56,000
					$ 73,000

Occupancy		Total Months	Per Month	
Staff	16	192	$ 150	$ 29,000
Conference/hearings	9	23 days	50/day	1,000
				$ 30,000
Communication				
Staff	16	192	$ 50	$ 10,000
Reproduction				
Staff	16	192	$ 20	$ 4,000
Data processing		12	$ 2,500	$ 30,000
Supplies, equipment				
Staff	16	192	$ 70	$ 13,000

TABLE B-2 (Continued)

TEST DEVELOPMENT

Personnel	n	Months/ Persons	Total Months	Salary Per Person-Year	Total Cost
Professional staff	8	12	96	$34,000	$ 272,000
Support staff	12	12	144	$17,000	204,000
			240		
Field supervisor	1	3	3	$18,000	5,000
Conference participants	144		22*	$34,000	62,000
					$ 543,000

Travel		Days	Travel Costs	Per Diem	
Staff	60	180	$300	$ 55	$ 28,000
Conference participants	144	432	$300	$ 55	67,000
Field supervisor		80% of 3-month salary			4,000
					$ 99,000

Occupancy		Total Months	Per Month	
Staff	20	240	$ 150	$ 36,000
Conference participants	22	66 days	$ 50	3,000
				$ 39,000

Communication					
Staff	20		240	$ 50	$ 12,000
Field supervisor		17% of 3-month salary			1,000
Test mailing					1,000
					$ 14,000

Reproduction					
Staff	20		240	$ 20	$ 5,000
Test printing		1,200 tests @ $1.50			2,000
					$ 7,000

TABLE B-2 (Continued)

TEST DEVELOPMENT (Continued)	n	Months/ Persons	Total Months	Salary Per Month	Total Cost
Data processing			12	$ 5,000	$ 60,000
Supplies, equipment	20		240	$ 70	$ 17,000
SAMPLE DESIGN AND SELECTION					
Personnel				Per Person-Year	
Professional staff	10	8	80	$34,000	$ 227,000
Support staff	16	8	128	$17,000	181,000
					$ 408,000
Travel		Days	Travel Cost	Per Diem	
Staff	16	48	$300	$ 55	$ 7,000
Occupancy		Months/ Persons	Total Months	Per Month	
Staff	26	8	208	$ 150	$ 31,000
Communication					
Staff	26	8	208	$ 50	$ 10,000
Reproduction					
Staff	26	8	208	20	$ 4,000
Data processing			8	$ 9,000	$ 72,000
Supplies, equipment					
Staff	26		208	$ 70	$ 15,000

TABLE B-2 (Continued)

PRINTING

Personnel	n	Months/ Persons	Total Months	Salary per Person-Year	Total Cost
Professional staff	3	1	3	$34,000	$ 9,000
Support staff	5	1	5	$17,000	7,000
			8		$ 16,000
Travel		**Days**	**Travel Cost**	**Per Diem**	
Staff	4	12	$300	$ 55	$ 2,000
Occupancy		**Months/ Persons**	**Total Months**	**Per Month**	
Staff	8	1	8	$ 150	$ 1,000
Communication					
Staff	8	1	8	$ 50	$ 1,000
Reproduction					
Staff	8	1	8	$ 20	--
Test printing†		250,000 @ $.40			$ 100,000
Data processing			1	$ 3,000	$ 3,000
Supplies, equipment					
Staff	8	1	8	$ 70	$ 1,000

TABLE B-2 (Continued)

DATA COLLECTION

Personnel	n	Months/ Persons	Total Months	Salary per Person-Year	Total Cost
Professional staff	12	5	60	$34,000	$ 170,000
Support staff	16	5	80	$17,000	113,000
			140		
Field supervisors	200	3.5	700	$18,000	1,050,000
Test administrators	450	1.5	675	$12,000	675,000
					$2,008,000

Travel		Days	Travel Cost	Per Diem	
Staff	40	120	$300	$ 55	$ 19,000
Field supervisors		80% of 700-month salary			840,000
Test administrators		15,625 schools @ $9			141,000
					$1,000,000

Occupancy		Months/ Persons	Total Months	Per Month	
Staff	28	5	140	$ 150	$ 21,000
Field staff training††					3,000
					$ 24,000

Communication					
Staff	28	5	140	$ 50	$ 7,000
Field supervisors		17% of 700-month salary			179,000
Test mailing		250,000 @ $.50			125,000
					$ 311,000

Reproduction					
Staff	28	5	140	$ 20	$ 3,000
Supervisor training material		250 sets @ $30			8,000
Test administrators training material		600 sets @ $5			3,000
					$ 14,000

TABLE B-2 (Continued)

DATA COLLECTION (Continued)

Data processing	n	Months/ Persons	Total Months	Per Month	Total Cost
Supplies, equipment					
Staff	28		140	$ 70	$ 10,000
SCORING AND ELIGIBILITY CALCULATION					
Personnel				Salary per Person-Year	
Professional staff	12	7	84	$34,000	$ 238,000
Support staff	16	7	112	17,000	159,000
Scorers	45	4	180	17,000	255,000
			376		$ 652,000
Travel		Days	Travel Cost	Per Diem	
Staff	25	75	$300	$ 55	$ 12,000
Occupancy		Months/ Persons	Total Months	Per Month	
Staff	25	7	196	$ 150	$ 29,000
Scorers	45	4	180	150	27,000
					$ 56,000
Communication					
Staff	25	7	196	$ 50	$ 10,000
Reproduction					
Staff	25	7	196	$ 20	$ 4,000

TABLE B-2 (Continued)

SCORING AND ELIGIBILITY CALCULATION (Continued)

	n	Months/ Persons	Total Months	Per Month	Total Cost
Data processing			7	$ 5,000	$ 35,000
Data processing, machine scoring	250,000 @ $3				750,000
					$ 785,000
Supplies, equipment					
Staff	25		196	$ 70	$ 14,000
Scorers	45		180	70	13,000
					$ 27,000
REPORTING					
Personnel				Salary per Person-Year	
Professional staff	4	4	16	$34,000	$ 45,000
Support staff	12	4	48	17,000	68,000
					113,000
Travel		Days	Travel Cost	Per Diem	
Staff	15	45	$300	$ 55	$ 7,000
Occupancy		Months/ Persons	Total Months	Per Month	
Staff	16	4	64	$ 150	$ 10,000
Communication					
Staff	16	4	64	$ 50	$ 3,000

TABLE B-2 (Continued)

REPORTING (Continued)

Reproduction	n	Months/ Persons	Total Months	Per Month	Total Cost
Staff	16	4	64	$ 20	$ 1,000
Report generation	20,000 @ $1.50				30,000
					$ 31,000
Data processing			4	$ 5,000	$ 20,000
Supplies, equipment					
Staff	16		64	$ 70	$ 4,000

*Corresponds to 340 days (20 working days/month) including 3 months (60 days) participant preparation time.

**Figures are rounded to thousands.

***Rounded, corresponds to 432 days.

†Includes manpower for printing.

††Supervisors: 10 sessions for 5 days each @ $50/day.
Administrators: 18 sessions for ½ day each @ $25.

APPENDIX C. STATE-LEVEL ACHIEVEMENT DATA

TABLE C-1

ESTIMATED CHANGES IN SHARES OF ELIGIBLES

	% Change in Share	
	1970 Poverty vs. 1975 Poverty	1970 Poverty vs. Achievement
Northeast		
Connecticut	21	90
Maine	13	--
Massachusetts	14	--
New Hampshire	37	--
New Jersey	37	-12
New York	10	-16
Pennsylvania	23	7
Rhode Island	-3	--
Vermont	59	--
North-Central		
Illinois	46	31
Indiana	10	56
Iowa	-17	--
Kansas	-23	--
Michigan	28	58
Minnesota	-2	-13
Missouri	2	-10
Nebraska	-13	--
North Dakota	-25	--
Ohio	22	2
South Dakota	-27	--
Wisconsin	11	24
South		
Alabama	-44	-18
Arkansas	-30	-25
Delaware	-13	52
District of Columbia	-29	108
Florida	18	5
Georgia	-10	43
Kentucky	-12	-18
Louisiana	-21	11
Maryland	-4	68

TABLE C-1 (Continued)

	% Change in Share	
	1970 Poverty vs. 1975 Poverty	1970 Poverty vs. Achievement
Mississippi	-19	-0.3
North Carolina	-23	-20
Oklahoma	-23	-48
South Carolina	-15	8
Tennessee	-15	-30
Texas	-2	-32
Virginia	-23	18
West Virginia	-20	-36
West		
Alaska	-56	87
Arizona	-1	-36
California	17	26
Colorado	-11	-8
Hawaii	4	--
Idaho	-6	--
Montana	0	
Nevada	29	--
New Mexico	3	-34
Oregon	-16	13
Utah	-18	--
Washington	12	6
Wyoming	-23	--

TABLE C-2

VARIATIONS IN TEST DATA FOR THE SEVEN STATES CHOSEN FOR DISTRICT-LEVEL ANALYSES

State	Grade Level Tested	Test Used	Year of Testing
Alabama	4	CAT (standardized)	1975
California	6	CTBS (standardized)	1973
Florida	6	Tailor-made test	1975
Michigan	4	Tailor-made test	1974
New Mexico	5	CTBS	1974
New York	6	Tailor-made test	1974
Rhode Island	4	ITBS (standardized)	1974

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